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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/576,826	11/03/2006	Herve Le Bihan	Serie 6385	9049

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AIR LIQUIDE
Intellectual Property
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EXAMINER	
PETTITT, JOHN F	
ART UNIT	PAPER NUMBER
3744	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/576,826	LE BIHAN, HERVE	
	Examiner	Art Unit	
	John F. Pettitt	3744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 September 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 September 2009* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings were received on 09/14/2009. These drawings are accepted.

Claim Objections

2. **Claims 11-18** are objected to because of the following informalities: The recitation, "a first portion of the air is sent to the vessel of the mixing column; b) the second portion of the air" (line 5-7) lacks antecedent basis and should read --a first portion of the air is sent to **a** vessel of the mixing column; b) **a** second portion of the air-. Further, the recitation, "to the top of the mixing column" (line 17) should read -- to **a** top of the mixing column--. Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. **Claims 11-20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Hogg et al. (5,490,391) in view of Corduan et al. (US 2003/0051504).

In regard to claims 11, 13, 14, and 19-20, Hogg teaches a method for separating air by cryogenic distillation in an installation comprising a medium-pressure column (28), a low-pressure column (36) and a mixing column (68) in which: a) air is compressed in a compressor (12), cooled in a heat exchange line (20, 42, 84, 34) and a first portion (66) of the air is sent to a vessel of the mixing column (68); b) a second portion (18) of the air is cooled in the heat exchange line (20, 42, 84, 34), and divided into a first fraction (32) and a second fraction (26); c) the first fraction (32) of the air is cooled in the heat exchange line (20, 42, 84, 34), at least partially liquefied, and sent to the medium-pressure column (28); d) the second fraction (26) of the air is expanded in a Claude turbine (24) and sent to the medium-pressure column (28); e) an oxygen-enriched liquid (40) and a nitrogen-enriched liquid (50) are sent from the medium-pressure column (28) to the low-pressure column (36); f) an oxygen-enriched liquid (70) is sent from the low-pressure column (36) to a top of the mixing column (68); g) at least one flow of liquid (70 or 93) is drawn off from the medium (28) or low-pressure column (36); and h) an oxygen-rich flow (76) is drawn off from the mixing column (68) and heated in the heat exchange line (20, 42, 84, 34).

Hogg does not teach that the second portion is compressed before heat exchange line portion (20); however, it is known in the art to compress an inlet stream further with a booster compressor prior to expanding the inlet stream, as taught by Corduan. Corduan teaches that air is compressed in booster compressor (71) which is

powered by the turboexpander (75). Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify Hogg with a compressor on line (18) for the purpose of increasing the pressure of the air stream so that the expansion turbine (24) of Hogg would be able to produce greater refrigeration.

In regard to claim 12, Hogg teaches that the liquid drawn off from the low-pressure column (36) is an end product (86, column 6, lines 10-12).

In regard to claims 15-16, Hogg does not explicitly teach the pressures employed in the columns. However, Corduan teaches that the mixing column (27) operates at between 8 and 20 bar abs (parag. 18). Further, it is clear that selection of the pressures of the columns is varied based on local conditions and therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to operate the columns and the mixed column (68) of Hogg at the pressures 8-20 bar for the purpose of efficiently separating the constituents of air.

Alternatively, Hogg fails to explicitly disclose the pressure employed in the columns. However, Hogg explicitly teaches that the mixing column provides some of the refrigeration required in separating air (column 3, lines 5-15, 40-45). Further, Corduan discloses that that the mixing column (27) operates at between 8 and 20 bar abs (parag. 18). The pressure of the mixing column is recognized as a result-effective variable, i.e. a variable which achieves a recognized result. In this case, the recognized result is the amount of refrigeration that needs to be provided by the main heat exchanger. Therefore, since the general conditions of the claim, i.e. the pressure of a mixing column, were disclosed in the prior art by Corduan, it is not inventive to discover

the optimum workable range by routine experimentation, and it would have been obvious to one of ordinary skill in the art at the time of the invention to operate the mixing column disclosed by Hogg at the pressures disclosed by Corduan for the purpose of minimizing the required refrigeration.

In regard to claim 17, Hogg as modified by Corduan teaches that between 40 and 90% of the air sent for distillation (75 %, column 3, lines 40-45) is boosted (by the booster of Corduan).

In regard to claim 18, Hogg as modified by the teachings of Corduan, teaches that the boosted air is boosted to about 8 bar (Corduan - parag 54); this is judged to be suffiicently close to the range of 12 to 30 bara, or at least an obvious extension of the method of Hogg and Corduan.

Response to Arguments

5. Applicant's arguments with respect to claims 11 and 19 have been considered but are moot in view of the new ground(s) of rejection. It is noted that the rationale for the rejection has been reconsidered and therefore, the applicant's arguments that the rationale of the rejection is based on improper hindsight is moot. Further, the allegation that the use of the mixing columns in Hogg and Corduan are employed for different purposes is not persuasive as there are no claim limitations regarding the mixing column which have not been explicitly met by the references.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John F. Pettitt whose telephone number is 571-272-0771. The examiner can normally be reached on M-F 8a-4p.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler or Frantz Jules can be reached on 571-272-4834 or 571-272-6681. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/John F Pettitt /
Examiner, Art Unit 3744

JFP III
January 15, 2010

/Cheryl J. Tyler/
Supervisory Patent Examiner, Art Unit 3744